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FIG. 1

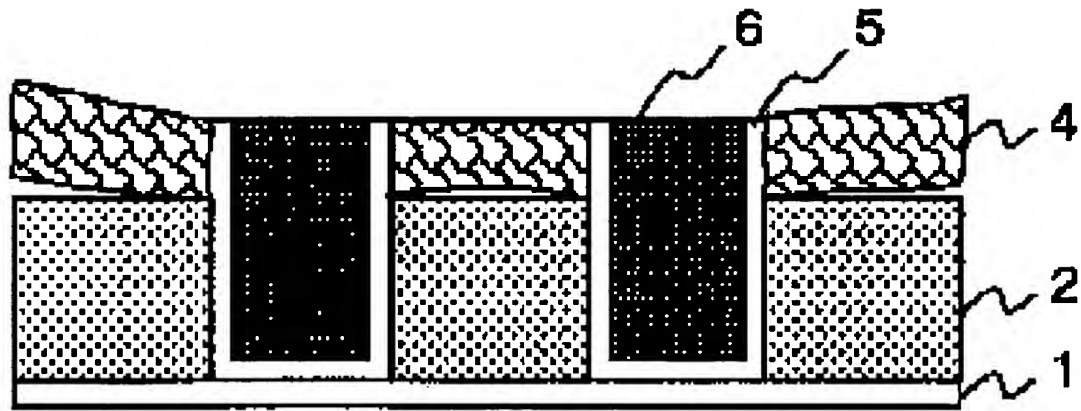


FIG. 2

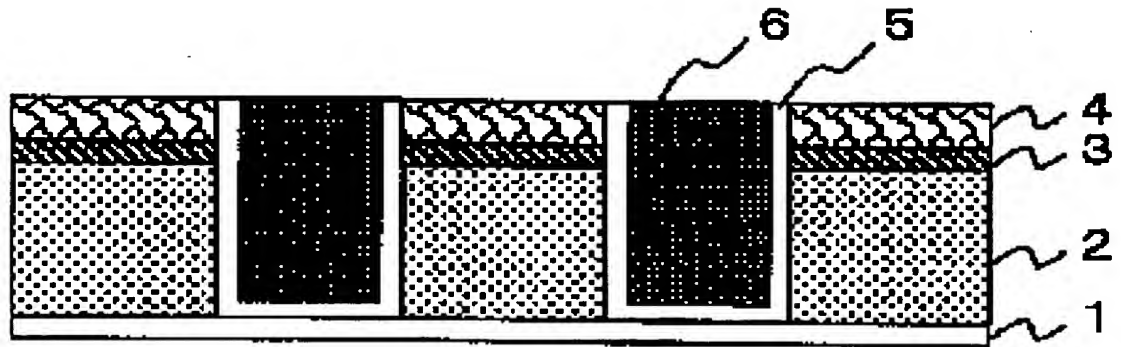


FIG. 3

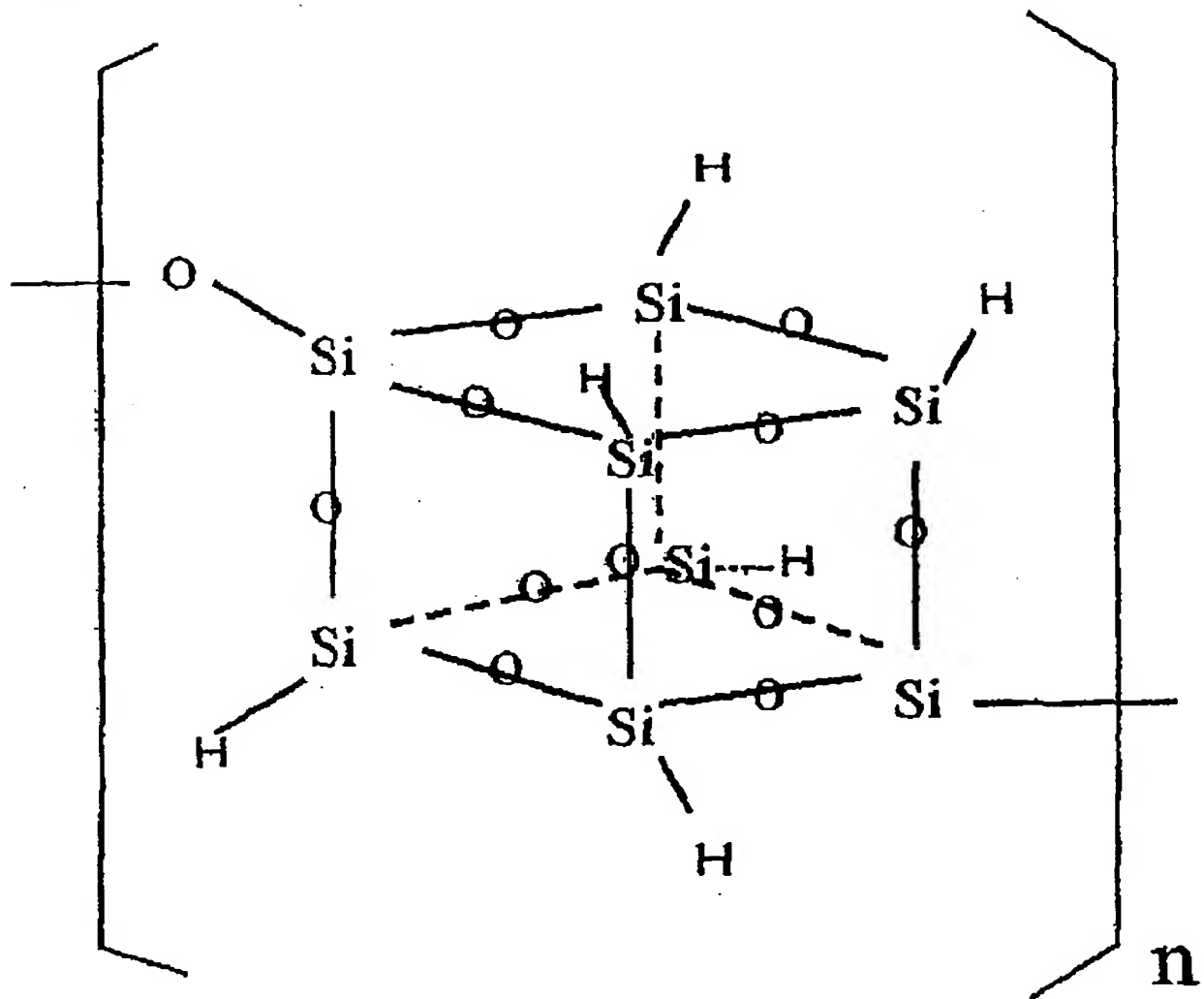


FIG. 4

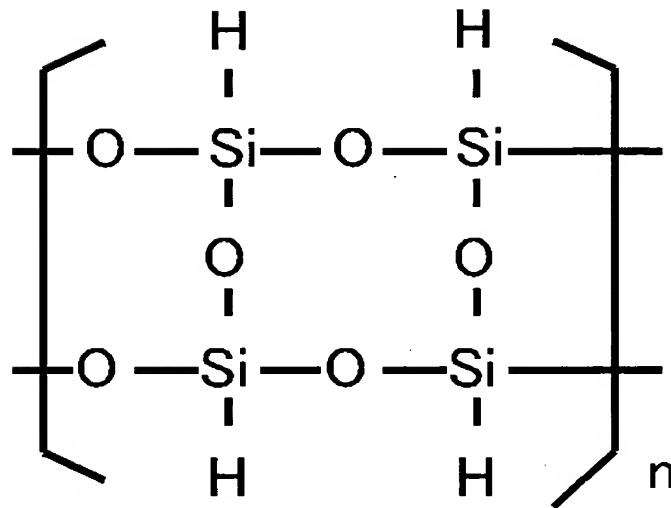


FIG. 5

| | |
|--|------------------------|
| DIELECTRIC CONSTANT (at 1 MHz) | 2.9 |
| REFRACTIVE INDEX (at 633 nm) | 1.39 |
| STRESS (dyne/cm ²) | 7.00 X 10 ⁸ |
| HARDNESS (GPa) | 0.9 |
| ELASTICITY (GPa) | 6 |
| THERMAL EXPANSION COEFFICIENT (ppm/deg-C) | 18 |
| GLASS TRANSITION TEMPERATURE (deg-C) | NA |
| THERMAL CONDUCTIVITY (W/mK, at 25 deg-C) | 0.31 |

FIG. 6

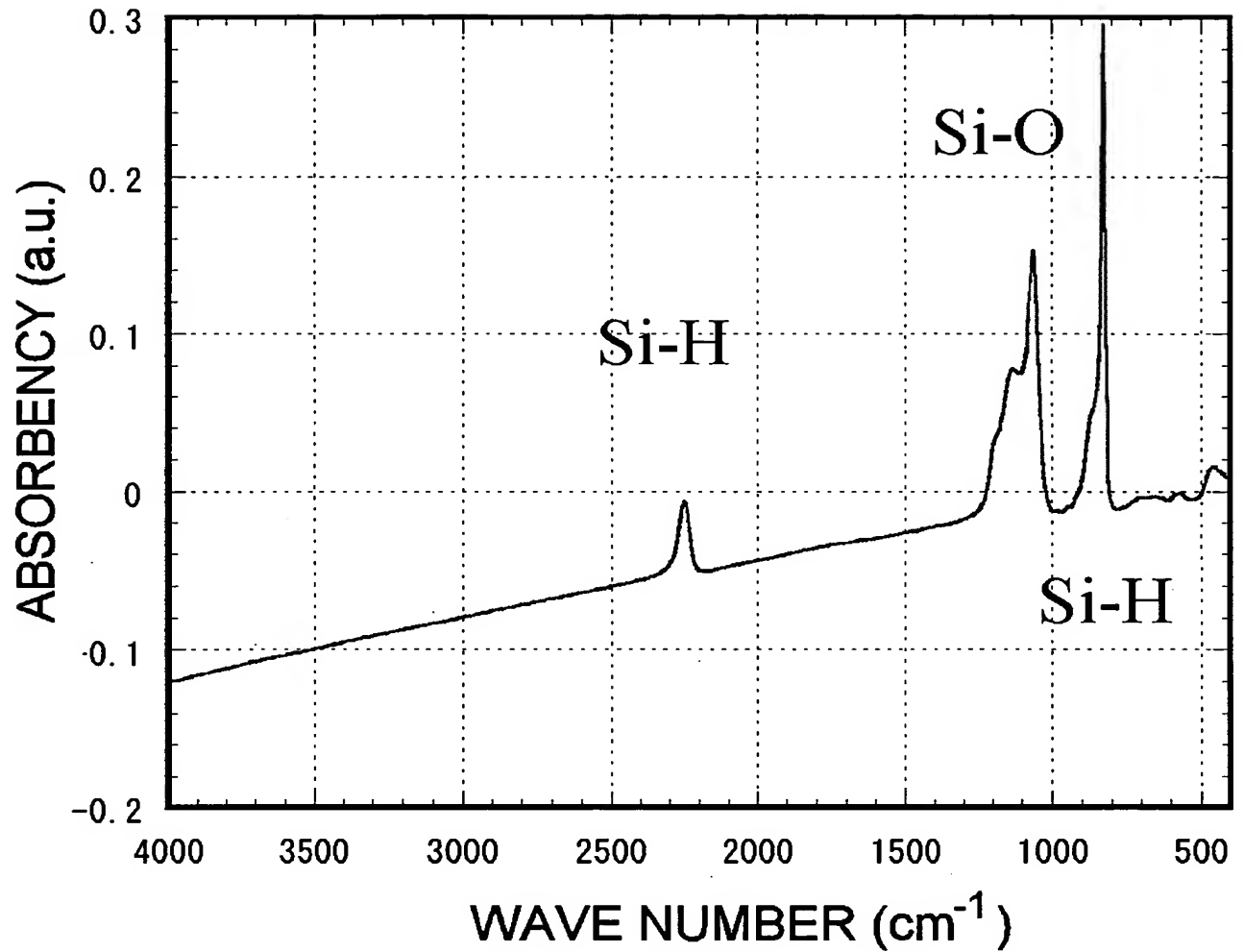


FIG. 7

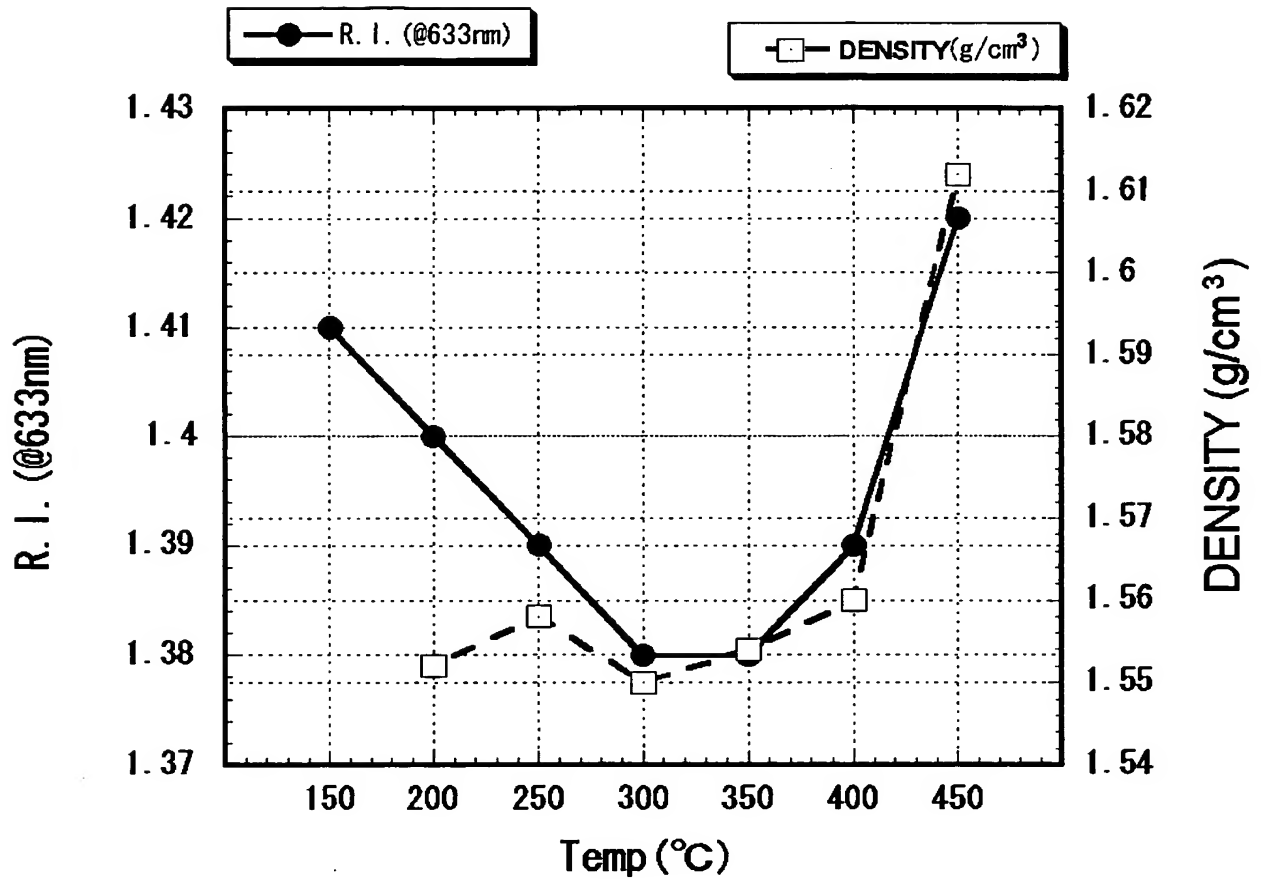


FIG. 8A

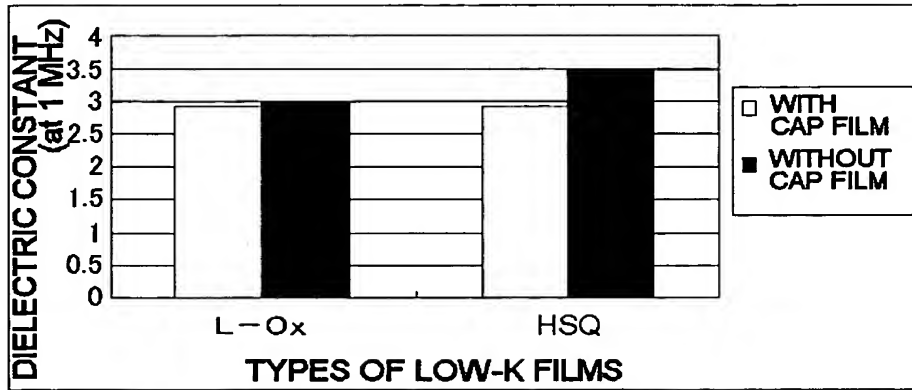


FIG. 8B

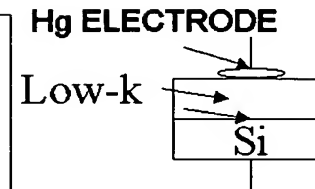


FIG. 8C

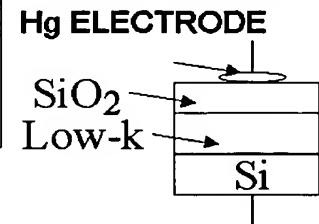


FIG.9A

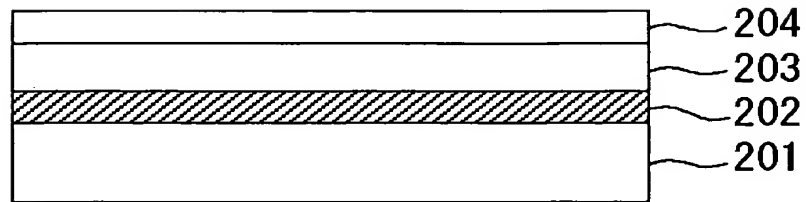


FIG.9B

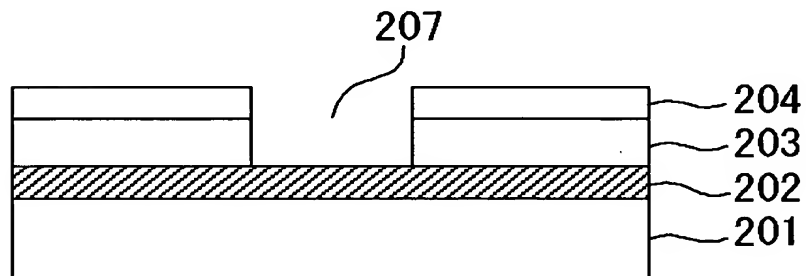


FIG.9C

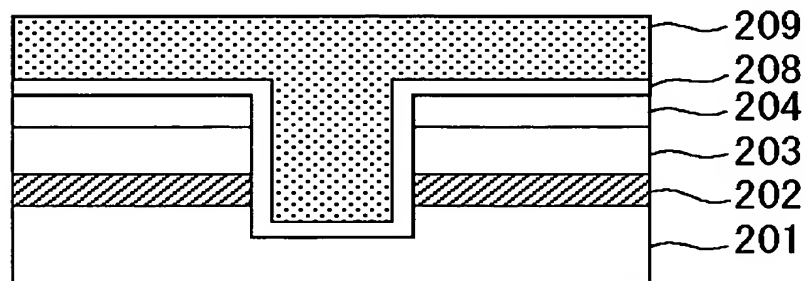


FIG.9D

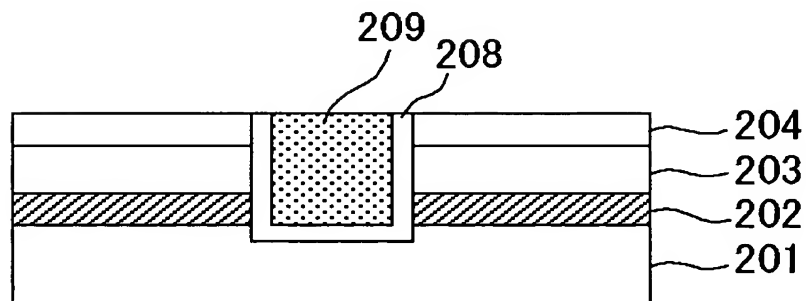


FIG.10

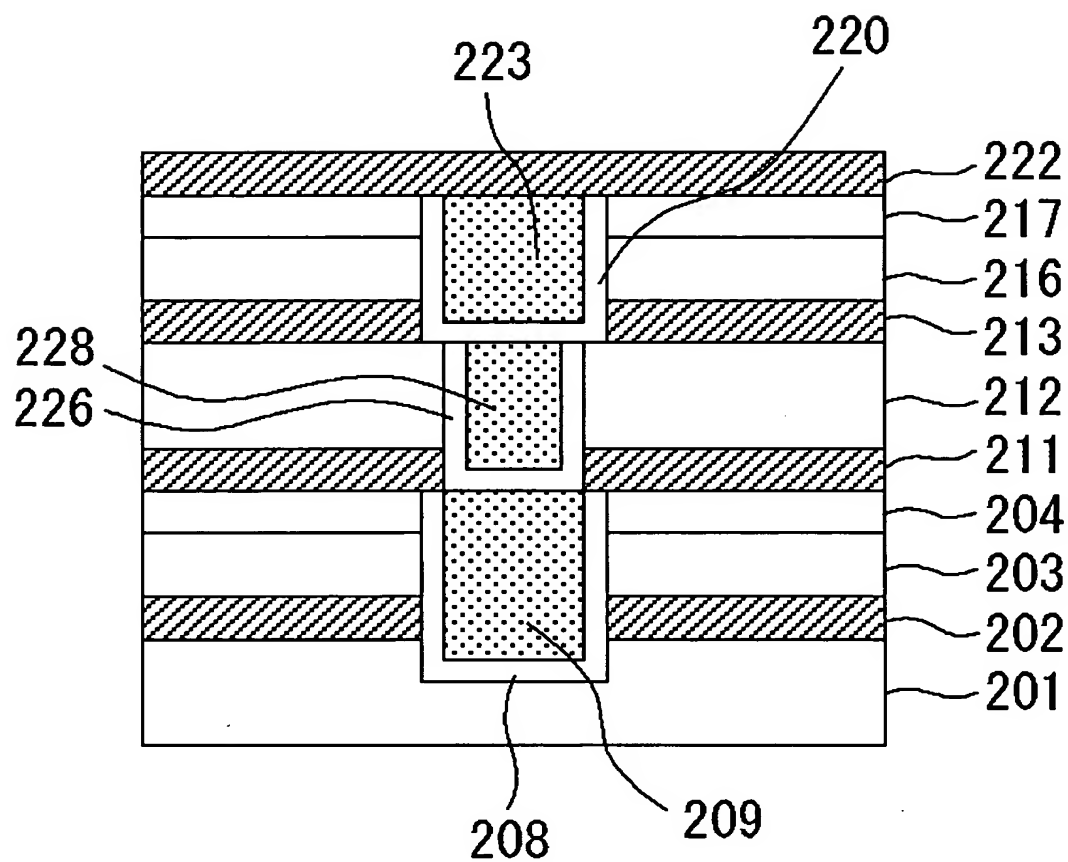


FIG.11A

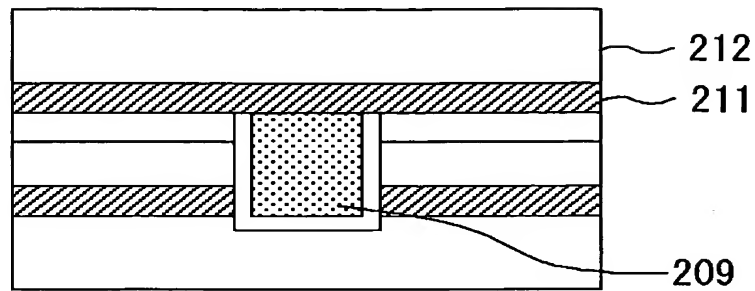


FIG.11B

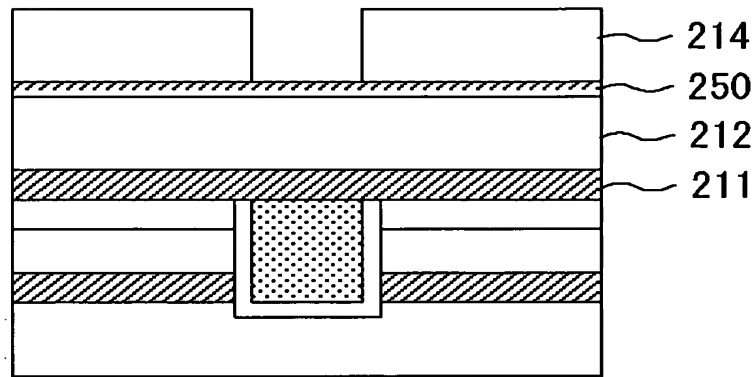


FIG.11C

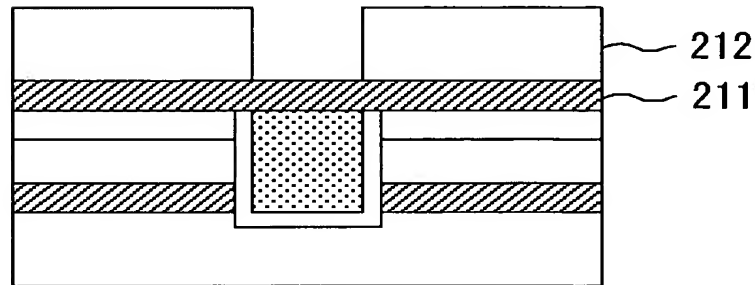


FIG.11D

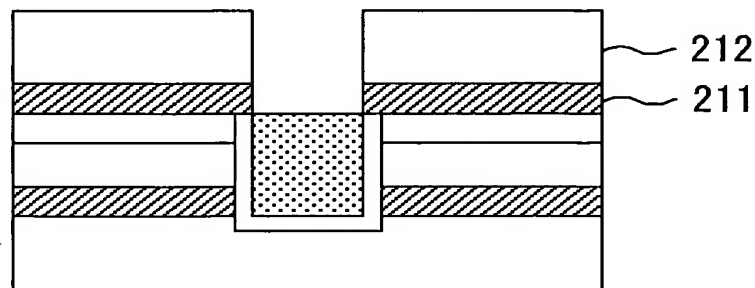


FIG.12E

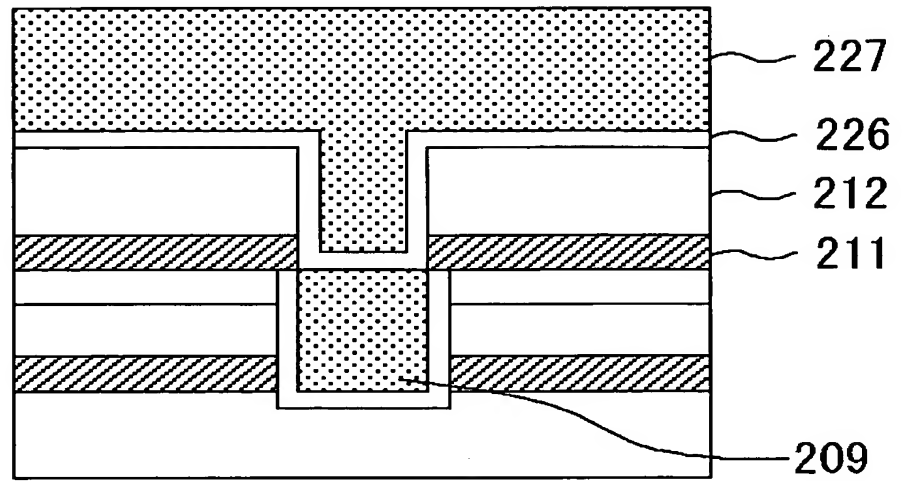


FIG.12F

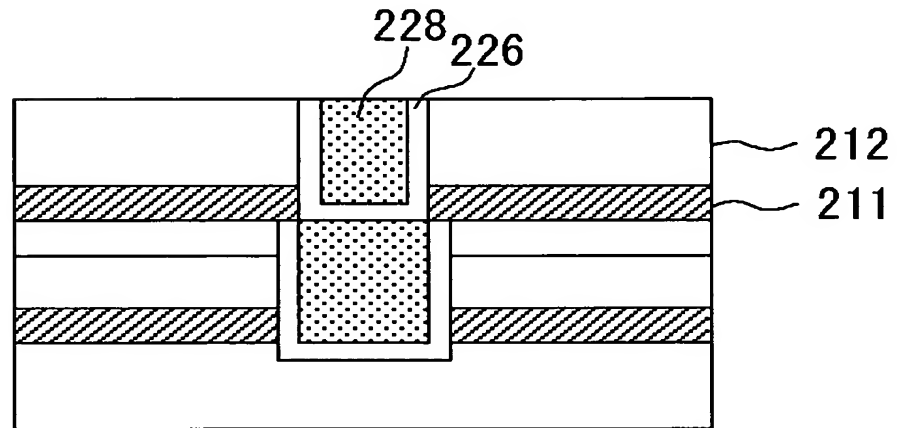


FIG.12G

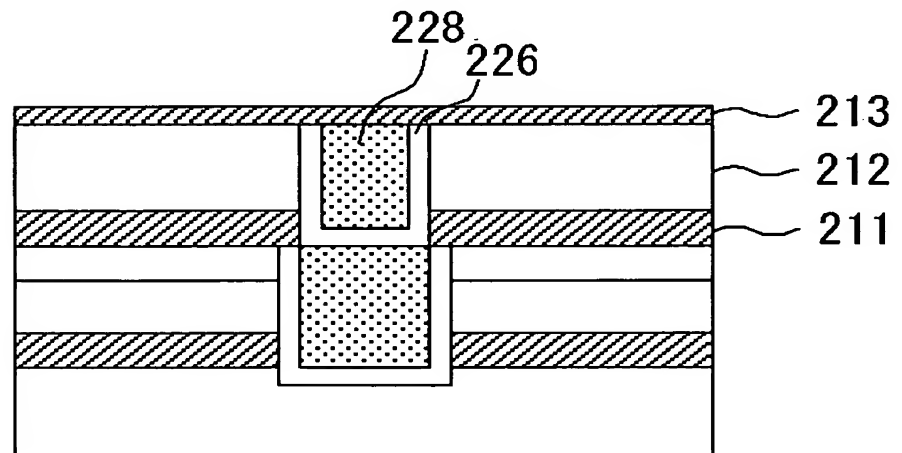


FIG.13H

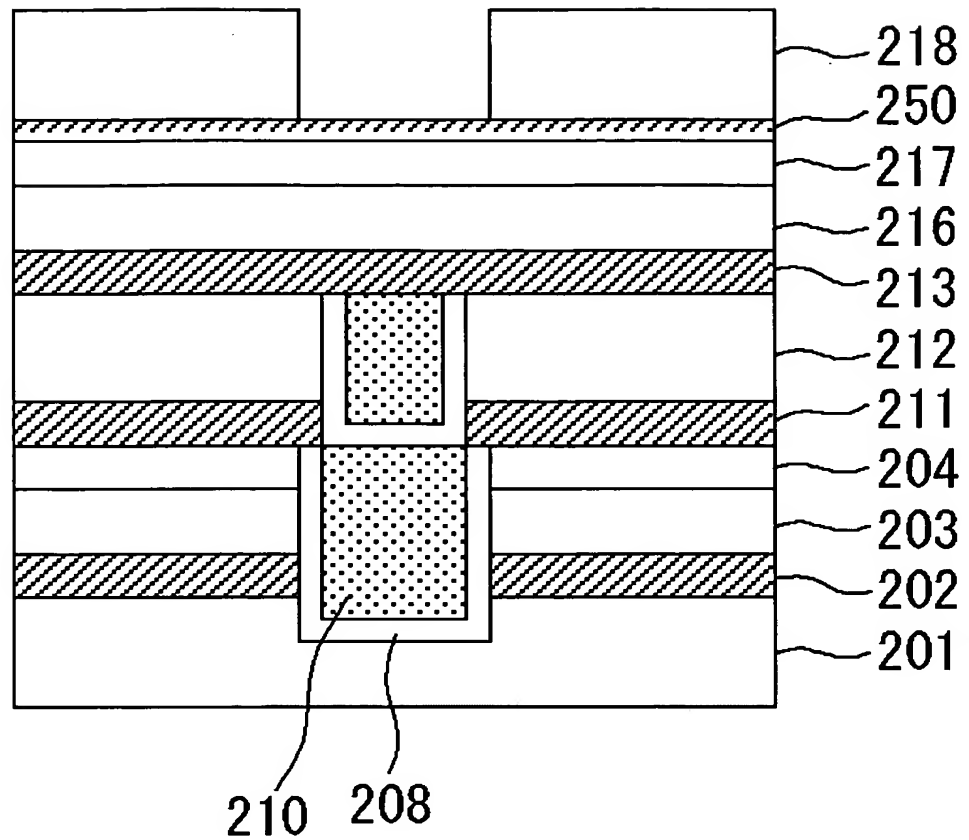


FIG.13I

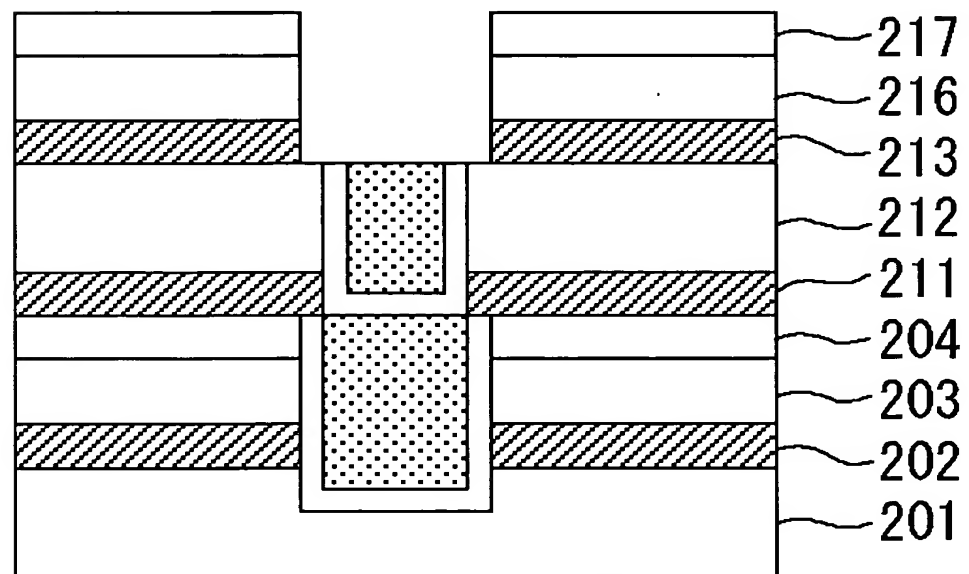


FIG.14J

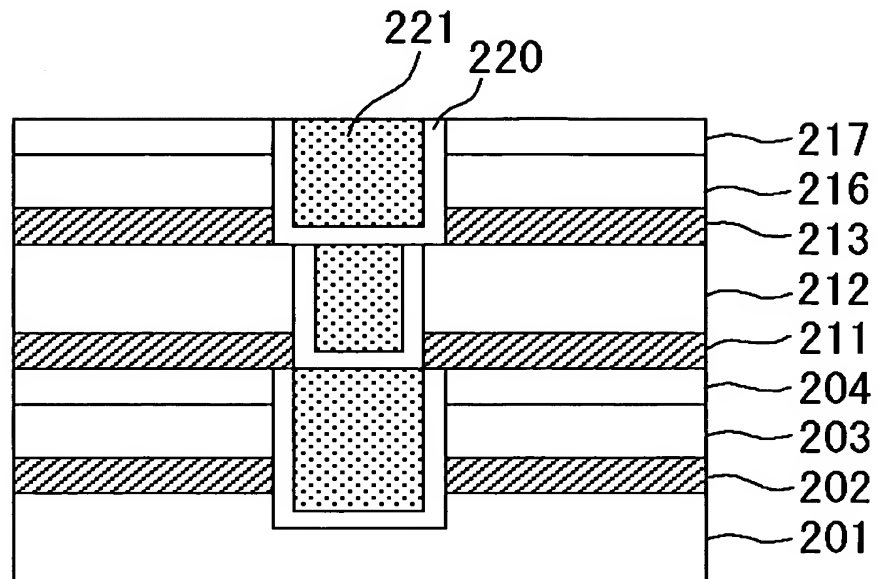


FIG.14K

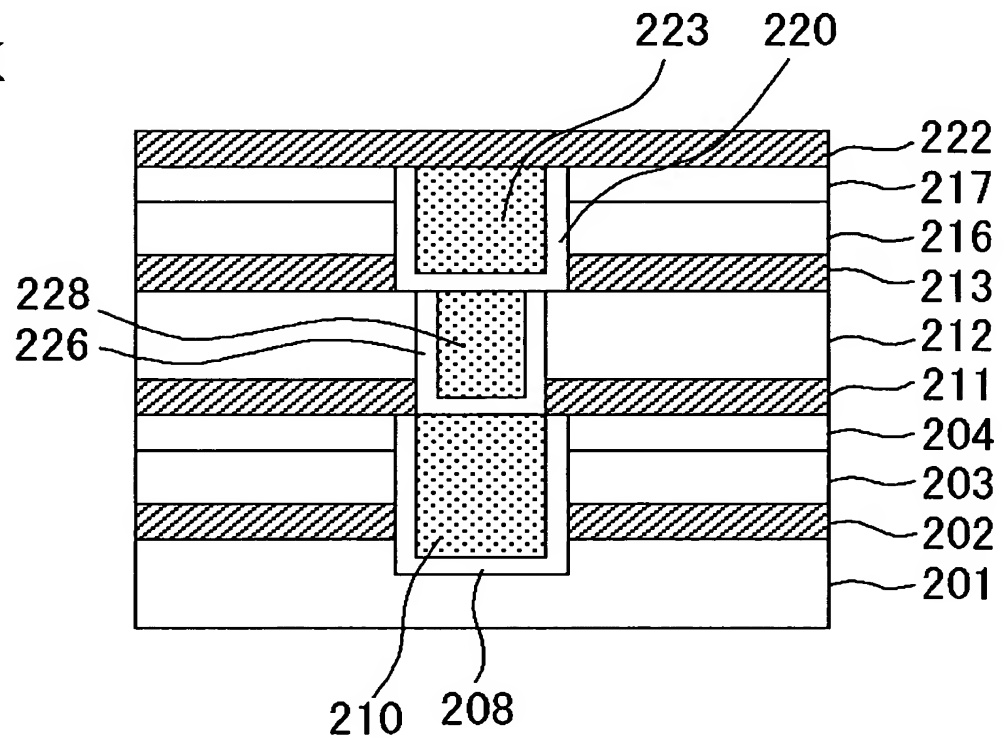


FIG.15

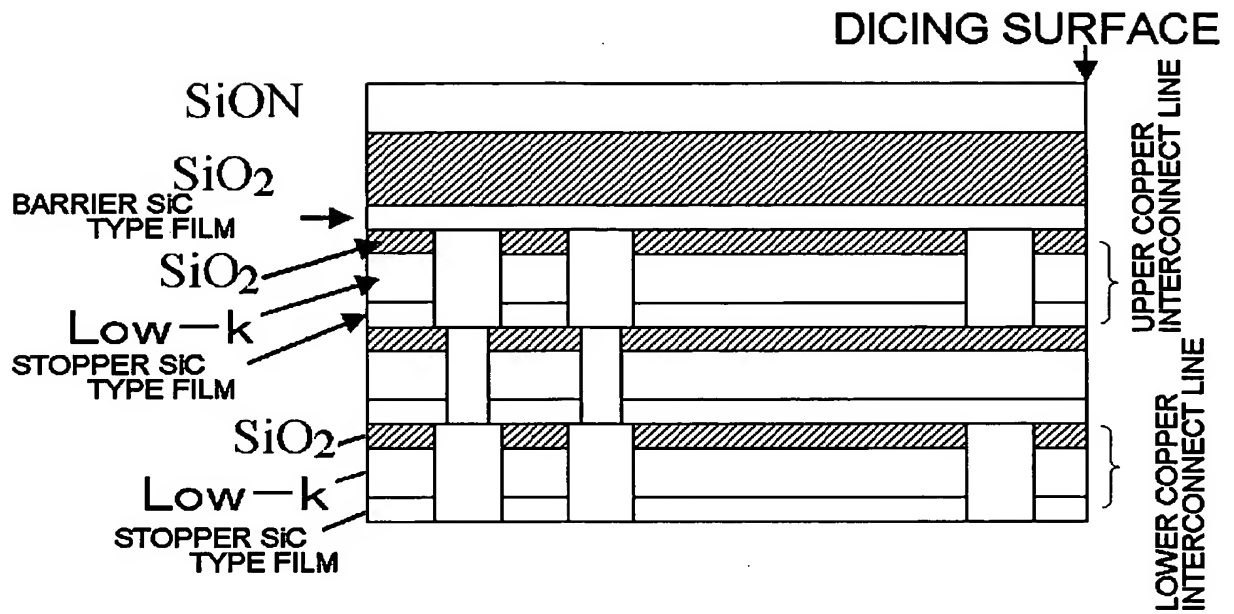


FIG.16

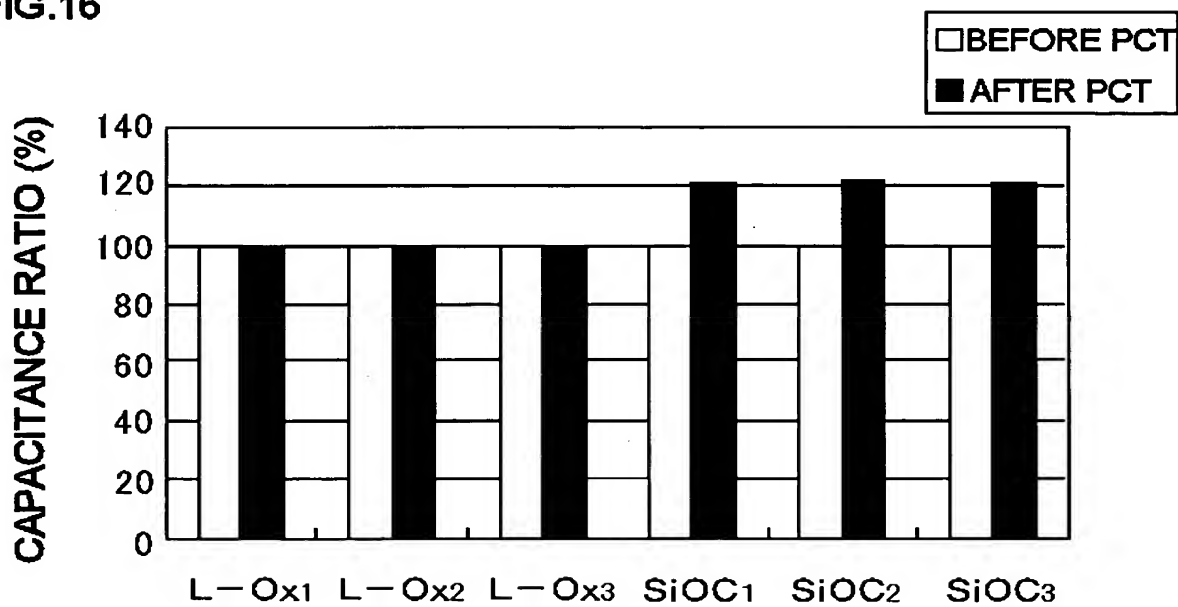
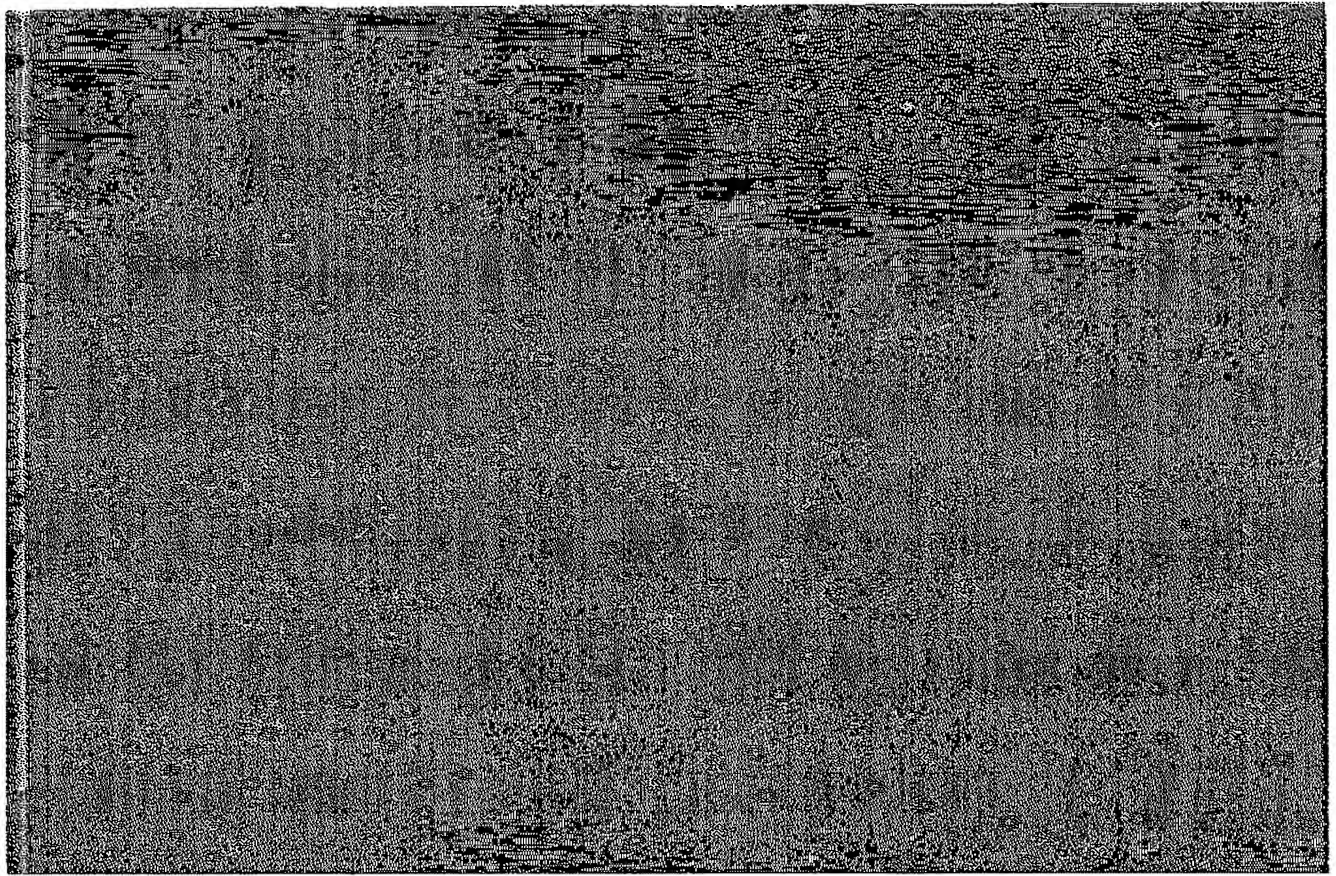


FIG. 17



←————→
0.75mm

FIG. 18A

| | UPPER FILM | | | |
|---------------------------|----------------------|-----------------------|------|------------|
| | SiO ₂ (i) | SiO ₂ (ii) | SiCN | SiCN (CMP) |
| SiOC | × | × | ○ | ○ |
| POLYPHENYLENE | × | NO DATA | ○ | ○ |
| L-Ox TM | ○ | NO DATA | ○ | ○ |
| POROUS L-Ox TM | ○ | NO DATA | ○ | ○ |
| SiO ₂ | NO DATA | NO DATA | ○ | ○ |

FIG. 18B

| | LOWER FILM |
|---------------------------|------------|
| | SiCN |
| SiOC | × |
| POLYPHENYLENE | × |
| L-Ox TM | ○ |
| POROUS L-Ox TM | ○ |
| SiO ₂ | ○ |